

**WHAT IS CLAIMED IS:**

- 1     1.     A communications method, the method comprising:  
2         operating a first communications device to:  
3             i) perform a decoding operation on a first signal including encoded signal  
4             information;  
5             ii) determine if the encoded signal information included in the first signal was  
6             successfully decoded; and  
7             iii) when it is determined that said encoded information was not successfully  
8             decoded, generating a first NAK signal having one of a plurality of possible NAK  
9             signal values, each of said plurality of possible NAK signal values corresponding  
10            to a different level of decoding success.
  
- 1     2.     The method of claim 1, wherein said decoding operation produces decoded information,  
2     the step of generating a first NAK signal including:  
3         selecting the first NAK signal value as a function of the quality of the decoded  
4     information.
  
- 1     3.     The method of claim 2, further comprising:  
2         when it is determined that said encoded information was successfully decoded,  
3     generating an ACK signal having an ACK signal value; and  
4         wherein each NAK signal value, in the plurality of NAK signal values, differs from any  
5     other one of the NAK signal values in said plurality by an amount which is less than the smallest  
6     amount any one of said NAK signal values differs from said ACK signal value.
  
- 1     4.     The method of claim 3, wherein said NAK and ACK signals are complex signals and  
2     wherein said NAK signal values and said ACK signal values are phase values.
  
- 1     5.     The method of claim 1,  
2     wherein operating the first device to perform a decoding operation includes:  
3         determining the quality of decoded information generated by decoding said  
4     encoded information;

5            wherein operating the first device to generate a first NAK signal includes  
6            operating the first device to select the first NAK signal value as a function of the  
7            determined quality of the decoded information; and  
8            wherein operating the first device further includes operating the first device to  
9            transmit the generated first NAK signal.

1    6.        The method of claim 5, wherein determining the quality of the decoded information  
2    includes:

3            maintaining decoding statistics indicating the reliability of the decoded information, said  
4    decoding statistics indicating the quality of the decoded information.

1    7.        The method of claim 6, wherein the maintained decoding statistics include a count of the  
2    number of detected errors in the decoded information.

1    8.        The method of claim 5, further comprising:

2            operating the first device to transmit said first NAK signal; and  
3            operating a second device to:

4                    i) receive said first NAK signal; and

5                    ii) determine, from said first NAK signal value, an amount of redundant  
6            information to transmit to said first device from, different amounts of redundant  
7            information being determined for at least two different NAK signal values.

1    9.        The method of claim 5, further comprising:

2            operating the first device to:

3                    transmit the generated first NAK signal;

4                    receive in a second signal including redundant information corresponding to said  
5            first received encoded signal;

6                    perform an additional decoding operation using said redundant information and  
7            information obtained from said first received signal; and

8                    determine if the additional decoding operation successfully decoded the encoded  
9            signal information included in the first signal.

1    10.    The method of claim 9, wherein said step of operating the first device to perform an  
2    additional decoding operation includes:

3            receiving a traffic channel assignment message from a second device; and  
4            identifying from information included in said traffic channel assignment message, the  
5    first signal to which said second signal corresponds.

1    11.    The method of claim 10,  
2            wherein said first device is a mobile node and said second device is a base station; and  
3            wherein the information included in said traffic channel assignment message used to  
4    identify the first signal is an index of a traffic segment used to transmit the first signal.

1    12.    The method of claim 10,  
2            wherein said first device is a mobile node and said second device is a base station; and  
3            wherein the information included in said traffic channel assignment message used to  
4    identify the first signal is a traffic channel index difference indicating a difference between the  
5    index of a traffic channel segment associated with the assignment message and a traffic channel  
6    segment used to transmit the first signal.

1    13.    The method of claim 9, wherein said first device is a base station and said second device  
2    is a mobile node, the method further comprising:  
3            operating the first device to transmit an uplink channel assignment message to the second  
4    device;  
5            operating the second device to identify from information included in the uplink channel  
6    assignment message the first signal for which redundant information is to be transmitted in an  
7    uplink channel segment assigned by said channel assignment message; and  
8            operating the second device to transmit said second signal including redundant  
9    information.

1    14.    The method of claim 13,  
2            wherein the information included in said uplink channel assignment message used to  
3    identify the first signal is an index of a uplink traffic segment used to transmit the first signal.

1    15.    The method of claim 13,

2 wherein the information included in said traffic channel assignment message used to  
3 identify the first signal is an uplink traffic channel index difference indicating a difference  
4 between an index of an uplink traffic channel segment associated with the assignment message  
5 and an uplink traffic channel segment used to transmit the first signal.

1 16. The method of claim 9, wherein said second signal includes, in addition to said  
2 redundant information, new encoded information, the method further comprising:  
3 operating said first device to decode said new encoded information.

1 17. The method of claim 9, further comprising:  
2 operating the first device to determine if the encoded signal information included in the  
3 first signal was successfully decoded by said additional decoding operation; and  
4 when it is determined that said encoded information was not properly decoded by said  
5 additional decoding operation, operating the first device to generate a second NAK signal having  
6 one of said plurality of possible NAK signal values, each of said plurality of possible NAK  
7 signal values corresponding to a different level of decoding success, operating the first device to  
8 generate a second NAK signal including selecting a second NAK signal value as a function of  
9 the quality of decoded information generated by said additional decoding operation.

1 18. The method of claim 1, further comprising:  
2 operating a second communications device to:  
3 i) perform an encoding operation on information to be transmitted to produce a  
4 first set of encoded information and a set of redundant information; and  
5 ii) transmit said first set of encoded information in said first signal.

1 19. The method of claim 18, wherein operating said second communications device further  
2 includes operating said second communications device to:  
3 transmit in a traffic channel assignment message used to assign a traffic channel segment  
4 used to transmit said first signal, an indicator indicating that the first signal does not correspond  
5 to a previously transmitted signal.

1 20. The method of claim 18, wherein operating said second communications device further  
2 includes:

operating said second communications device to:

receive a NAK signal from said first device, said NAK signal corresponding to said first signal; and

determine from the value of the received NAK signal what portion of the set of redundant information to transmit to said first device.

21. The method of claim 20, wherein operating said second communication device to determine what portion of the set of redundant information to transmit to said first device includes:

selecting the size of the portion of the set of redundant information as a function of the value of the received NAK signal, a larger size portion being selected when the value of the NAK signal indicates a first level of decoding success than when the value of the NAK signal indicates a second level of decoding success that indicates more decoding success than said first level.

22. The method of claim 20, further comprising:

operating the second communications device to transmit the determined portion of the set of redundant information to said first device in a second information signal.

23. The method of claim 22, further comprising:

operating said second communications device to transmit an assignment message used to assign a channel segment used to transmit said second information signal, said assignment message including information indicating the previously transmitted first signal to which the redundant information included in the second information signal corresponds, said assignment message being transmitted prior to said second information signal.

24. The method of claim 22, further comprising:

operating the second communications device to:

perform a second encoding operation on additional information to be transmitted to produce a second set of encoded information and a second set of redundant information; and

6                    wherein operating said second communications device to transmit a second  
7                    information signal includes operating the second communications device to include in  
8                    said second information signal a portion of said second set of encoded information.

1    25.    The method of claim 18, wherein said encoding operation is a low density parity check  
2    coding operation.

1    26.    A communications device comprising:  
2                    means for performing a decoding operation on a first signal including encoded signal  
3    information;  
4                    means for determining if the encoded signal information included in the first signal was  
5    successfully decoded; and  
6                    means for generating a first NAK signal having one of a plurality of possible NAK signal  
7    values, when it is determined that said encoded information was not successfully decoded, each  
8    of said plurality of possible NAK signal values corresponding to a different level of decoding  
9    signal success.

1    27.    The device of claim 26,  
2                    wherein said means for performing a decoding operation produces decoded information;  
3    and  
4                    wherein said means for generating a first NAK signal selects the first NAK signal value  
5    as a function of the quality of the decoded information.

1    28.    The communications device of claim 27, further comprising:  
2                    a transmitter, coupled to said means for generating a first NAK signal, for transmitting  
3    the generated first NAK signal;  
4                    a receiver for receiving a second signal including redundant information corresponding  
5    to said first received encoded signal; and  
6                    wherein said means for perform a decoding operation includes means for performing an  
7    additional decoding operation using said redundant information and information obtained from  
8    said first received signal.

1    29.    The communications device of claim 28, further comprising:

means for determining if the additional decoding operation successfully decoded the encoded signal information included in the first signal; and

means for generating a second NAK signal by selecting a second NAK signal value as a function of the quality of decoded information generated by said additional decoding operation, when it is determined that said encoded information was not properly decoded by said additional decoding operation, said second NAK signal having one of said plurality of possible NAK signal values.

30. A method of operating a communications device comprising:

encoding, using an encoder, information to be transmitted to produce a first set of encoded information and a set of redundant information;

transmitting said first set of encoded information in a first signal;

receiving a NAK signal from a device to which said first signal was transmitted; and

selecting a portion of the set of redundant information to transmit to said first device as a function of the value of the received NAK signal, said function causing different amounts of redundant information to be selected for at least two different possible NAK signal values.

31. The method of claim 30, further comprising:

including in a first assignment signal used to assign a communications channel segment used to transmit said first signal, an indicator indicating that the first signal does not correspond to a previously transmitted signal; and

transmitting said first assignment signal prior to or in parallel with transmitting said first signal.

32. The method of claim 30, wherein selecting a portion of the set of redundant information to be transmit includes selecting a larger size portion of redundant information when the value of the NAK signal indicates a first level of received encoded signal quality than when the value of the NAK signal indicates a second level of received encoded signal quality that is better than said first level of received encoded signal quality.

33. The method of claim 32, further comprising:

transmitting a second assignment signal indicating an assignment of a channel segment to be used to transmit said selected portion of the set of redundant information, said second

4 assignment signal including information identifying a channel segment used to transmit said first  
5 signal; and  
6 transmitting the selected portion of the set of redundant information to said first device in  
7 a second information signal.

1 34. The method of claim 33, further comprising:  
2 performing a second encoding operation on additional information to be transmitted to  
3 produce a second set of encoded information and a second set of redundant information; and  
4 wherein transmitting a second information signal includes:  
5 including in said second information signal a portion of said second set of  
6 encoded information.

1 35. The method of claim 30, wherein said encoding operation is a low density parity check  
2 coding operation.

1 36. A communications device comprising:  
2 an encoder for encoding information to be transmitted to produce a first set of encoded  
3 information and a set of redundant information;  
4 a transmitter for transmitting said first set of encoded information in a first signal;  
5 a receiver for receiving a NAK signal from a device to which said first signal was  
6 transmitted; and  
7 means for selecting a portion of the set of redundant information to transmit to said first  
8 device as a function of the value of the received NAK signal, said function causing different  
9 amounts of redundant information to be selected for at least two different possible NAK signal  
10 values.

1 37. The device of claim 36, further comprising:  
2 means for generating an assignment signal used to assign a communications channel  
3 segment used to transmit said first signal said assignment signal including an indicator  
4 indicating that the first signal does not correspond to a previously transmitted signal; and  
5 means for controlling the transmitting said first assignment signal prior to transmitting  
6 said first signal.



1 38. The method of claim 36, wherein said means for selecting selects a portion of the set of  
2 redundant information to be transmitted selects a first size portion when the value of the NAK  
3 signal indicates a first level of received encoded signal quality, said first size portion being a  
4 larger size portion of redundant information than a second size portion which is selected by said  
5 means for selecting when the value of the NAK signal indicates a second level of received  
6 encoded signal quality that is better than said first level of received encoded signal quality.